

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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| In the Matter of |) | |
| |) | |
| Amendment of Parts 1, 2, 22, 24, 27, 90 and |) | WT Docket No. 10-4 |
| 95 of the Commission's Rules to Improve |) | |
| Wireless Coverage Through the Use of Signal |) | |
| Boosters |) | |

COMMENTS OF NEXTIVITY, INC.

Nextivity, Inc. ("Nextivity"), by its undersigned counsel, hereby submits these brief comments in response to the Second Further Notice of Proposed Rulemaking ("Second FNPRM") in the above-captioned proceeding.¹ Nextivity is a U.S.-based leader in the development of advanced booster technology and has contributed significantly to the Commission's record regarding current signal booster technology and the development of rules governing the introduction and operation of that technology.² Signal boosters benefit users by making possible robust wireless service coverage in underserved, and difficult to serve areas, including rural areas.³

¹ *In the Matter of Amendment of Parts 1, 2, 22, 24, 27, 90, and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters*, Second Report and Order and Second Further Notice of Proposed Rulemaking, WT Docket No. 10-4, FCC 18-35 (rel. Mar. 23, 2018) (*Second FNPRM*).

² See, e.g., Reply Comments of Nextivity, Inc., *In the Matter of Amendment of Parts 1, 2, 22, 24, 27, 90, and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters*, WT Docket No. 10-4 (filed Apr. 3, 2017); *Ex Parte* Letter to Marlene H. Dortch, Secretary, Federal Communications Commission from Nextivity Inc., WT Docket No. 10-4 (filed Mar. 22, 2017); Comments of Nextivity, Inc., *In the Matter of Amendment of Parts 1, 2, 22, 24, 27, 90, and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters*, WT Docket No. 10-4 (filed Dec. 29, 2014); Comments of Nextivity, Inc., *In the Matter of Response of Verizon Wireless, V-COMM and Wilson Electronics Joint Proposal for the Design, Operation and Where Necessary Installation of Signal Boosters*, WT Docket No. 10-4 (filed Aug. 22, 2011).

³ *Second FNPRM* at ¶¶ 1, 4; Statement of Chairman Ajit Pai; Statement of Commissioner Brendan Carr; Statement of Commissioner Jessica Rosenworcel.

With appropriate technical and operational requirements, signal boosters can enhance wireless coverage without risk to wireless networks thus also benefiting service providers in need of technically acceptable and economic solutions to extend their network coverage. In that context, Nextivity commends the Commission for its continuing commitment to consider rule changes that will make this technology available to even more users⁴ while appropriately examining the technical and operational concerns relevant to particular spectrum bands, applications, and booster technologies.⁵

I. THE COMMISSION SHOULD EXPAND ACCESS TO VALUABLE SIGNAL BOOSTER TECHNOLOGY BY PROMPTLY ADDRESSING NONCONTROVERSIAL RULE AMENDMENTS SEPARATELY FROM ISSUES THAT REQUIRE CLOSER EXAMINATION

The Second FNPRM asks whether the rules can be structured in a way that avoids the need for additional, future rulemakings as new spectrum bands become available for flexible spectrum use.⁶ Given the significant benefits of signal booster technology, the public interest would be served by a regulatory process that fosters, rather than inhibits, the rapid advancements in booster technologies and the growing demand for this spectrum- and cost-efficient means of extending wireless coverage. As innovations in technologies and applications come to light, the Commission will be faced with proposals to expand use of boosters into different spectrum bands and in new

⁴ “. . . [W]e consider in this docket ways to make Consumer Signal Boosters more widely useful and available...” *Second FNPRM* at ¶ 3, n. 1.

⁵ In that regard, Nextivity applauds the Commission’s decision in the Second FNPRM to eliminate the “personal use” restriction for provider specific signal boosters, a decision that permits small businesses, public safety entities, and other organizations to share in the full benefits of signal boosters.

⁶ *Second FNPRM* at ¶ 19. While the Second FNPRM seeks input on this question as to additional spectrum bands, the Commission acknowledges its attempt to make the Consumer Signal Boosters rules as nimble as possible,” *Second FNPRM* at ¶ 28, the “evolving use of Consumer Signal Boosters” and its “desire to encourage technological innovation” in seeking input on proposals to allow embedded consumer Signal Boosters.

applications—proposals certain to raise a host of issues some of which will be able to be resolved more easily and quickly than others.

Nextivity encourages the Commission to support the expanded use of signal boosters in a variety of contexts with appropriate safeguards by separating the proposals that present more challenging issues requiring more time, input, and analysis from the Commission and outside parties from the booster proposals that can be adopted relatively quickly without the need to address complex interference or other issues. In this way, the Commission can act nimbly and allow users, providers, and manufacturers in the market to realize the full benefits of innovative booster technologies and applications with minimum risk.

With respect to expanding permissible Consumer Signal Booster use into additional spectrum bands, the Commission specifically asks whether it “can embed a set of criteria in the rules that, if fulfilled, will permit Consumer Signal Boosters in particular bands [without lengthy case-by-case regulatory proceedings.]”⁷ Nextivity supports this and similarly creative regulatory approaches aimed at avoiding burdensome regulatory requirements and lengthy process which can chill innovation and investment in booster technologies. If a strong showing can be made under the four (4) criteria outlined in the Second FNPRM for a new spectrum band,⁸ the Commission should release a public notice announcing its tentative conclusion that a band fits within those criteria and its intention to permit booster devices to operate on such frequencies. The public

⁷ *Second FNPRM* at ¶ 19.

⁸ *Second FNPRM* at ¶¶ 20-23. The four criteria identified in the Second FNPRM are: (1) is the band used for services to consumers or other nonlicensee users that require an increased or improved signal; (2) whether a meaningful number of licensees in the band will consent to booster operations; (3) what is the impact of other technologies and operations within the band and in adjacent bands and will those operations harm other users within the band in adjacent bands (or vice versa); (4) do current technical rules need to be adjusted to accommodate any such new service bands?

should be afforded an opportunity to weigh in under a shortened comment period on the issues directing discussion to the four criteria outlined in the Second FNPRM.

II. NEXTIVITY SUPPORTS AUTHORIZATION OF CONSUMER SIGNAL BOOSTERS IN THE 600 MHZ, WCS, AND BRS/EBS BANDS

The Commission specifically seeks comment on whether to authorize the operation of Consumer Signal Boosters in the 600 MHz (617-652 MHz and 663-698 MHz), WCS (2305-2320 MHz and 2345-2360 MHz), and BRS/EBS (2495-2690 MHz) bands.⁹ Nextivity strongly supports the immediate authorization of signal boosters in the 600 MHz and WCS bands, and to a more limited extent, in the BRS/EBS (2495-2690 MHz) bands.

Applying the four (4) criteria outlined in the Second FNPRM, the 600 MHz, WCS (Blocks A and B) and BRS/EBS band would meet criteria #1 (whether the band used to provide service to consumers or other non-licensee users) because the 600 MHz and WCS (Blocks A and B) are expected to extend carrier networks, in some cases, to serve consumers and non-licensee users in rural and hard to reach areas which typically are served by less infrastructure and often where users experience weaker signals and can benefit from booster technology.¹⁰ The Commission recently took steps to expand the use of the BRS/EBS band by to educational licensees, Tribal Nations and commercial entities.¹¹ As the use of this band for consumer and non-licensee user service increases

⁹ *Second FNPRM* at ¶ 24.

¹⁰ *See, e.g.*, T-Mobile, T-Mobile Ready To Rock New Spectrum With First 600 MHz LTE Smartphone & 5G-Ready Network Gear (Aug. 31, 2017), <https://newsroom.t-mobile.com/news-and-blogs/tmobile-600mhz.htm> (last visited May 16, 2018) (“T-Mobile plans to continue deploying LTE on 600 MHz at a record-shattering pace, starting in rural America and markets across more than 1.2 million square miles where the spectrum will be clear this year.”); Phil Goldstein, AT&T Begins Deploying 2.3 GHz WCS Spectrum for LTE (Sept. 9, 2015), <https://www.fiercewireless.com/wireless/at-t-begins-deploying-2-3-ghz-wcs-spectrum-for-lte> (last visited May 16, 2018) (discussing AT&T deployment of WCS spectrum for LTE service).

¹¹ *In the Matter of Amendment of Parts 1, 21, 73, 74 and 101 of the Commission’s Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the*

in response to this action, Consumer Signal Boosters will provide a valuable option to improve users' signal strength.

With respect to criteria #2 (whether a meaningful number of licensees consent), given that providers such as AT&T and T-Mobile, which acquired significant amounts of spectrum in the 600 MHz band Broadcast Incentive Auction,¹² already utilize signal booster technologies for other CMRS frequency bands, Nextivity anticipates that a “meaningful number of licensees” would consent to, and indeed welcome, signal booster operations in these bands.¹³ Similarly, providers such as AT&T, which holds a significant number of WCS licenses, may be motivated to support expansion of signal booster operations to improve service coverage for its customers. Further, as the public responds to the Commission's effort to foster greater use of BRS/EBS frequencies, booster technology¹⁴ (and, as discussed below, at a minimum, provider specific booster technology) should be made available to meet the resulting growing demand. In all instances, coordination required between signal booster manufacturers and providers ensures that the devices will not cause interference within the providers' networks and the technical parameters for signal boosters set forth in the Commission's rules will guard against interference outside of the designated band.

2150-2162 and 2500-2690 MHz Bands and Transforming the 2.5 GHz Band, Draft Notice of Proposed Rulemaking, WT Docket No. 03-66, 18-120, FCC CIRC1805-02 (pub. April 19, 2018) (*BRS/EBS NPRM*). The Commission proposed rule changes to reduce unnecessary regulatory burdens on licensees, promote greater spectrum efficiency, and facilitate the full use of EBS spectrum to provide advanced mobile broadband services, particularly in rural areas where this spectrum sits idle today.

¹² See FCC Incentive Auction – Forward Auction Bidder Summary, Appendix B, *available at* https://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0413/DA-17-314A3.pdf.

¹³ *Second FNPRM* at ¶ 21.

¹⁴ See *BRS/EBS NPRM*.

In examining the impact of other technologies and operations both within the band and in adjacent bands, and whether there is need to adjust the existing technical rules, criteria #3 and #4 in the Second FNPRM, Nextivity submits that signal boosters could successfully operate in the 600 MHz (617-652 MHz and 663-698 MHz) and WCS (2305-2320 MHz) bands under the existing Part 20 Consumer Signal Booster framework.

However, unpaired bands in which multiple operators are deploying LTE-TDD technology may warrant additional consideration to address the potential “impact of other technologies and operations both within the band and in adjacent bands,”¹⁵ and whether these bands can accommodate, in particular, Wideband Signal Boosters. For example, the BRS/EBS band (2495-2690 MHz) is an unpaired frequency band that matches 3GPP Band 41 and may include signals from multiple CMRS providers. LTE-TDD technology, often deployed in this band, splits the transmission of signals in the uplink and downlink direction in time. The typical duration of a frame is 10 ms and the switch point between uplink and downlink transmissions may lie at a number of different points within the 10 ms frame. Also, the switch point may not always be the same and may be adjusted to address, for example, changing capacity requirements in the uplink and downlink directions. A signal booster that aims to boost a TDD signal must therefore include a mechanism to detect when this switch point occurs so that the booster can switch its direction of operation (i.e., boosting the uplink or downlink signal). If the booster fails to do this, the booster risks transmitting noise to handsets or the broader network, thereby causing interference.

For a Provider Specific Signal Booster, risk of interference is minimal because the switch point is well defined because all of the base stations of a LTE-TDD network are synchronized. However, if the passband of the signal booster encompasses the spectrum of more than one

¹⁵ *Second FNPRM* at ¶ 22.

operator, this switch point will typically not be aligned and hence the signal booster may cause interference on one of the networks being boosted. For this reason, Nextivity believes that Provider Specific Signal Boosters may be authorized for use in the BRS/EBS bands under the existing Part 20 rules with no risk to the network. However, it would seem that more technical input and analysis may be needed before authorizing the use of Wideband Signal Boosters in the BRS/EBS band.

III. NEXIVITY AGREES WITH THE COMMISSION'S PROPOSAL TO PERMIT EMBEDDED SIGNAL BOOSTERS.

Nextivity supports the Commission's proposal to provide alternative advisory language, thereby "removing barriers to embedding signal boosters within vehicles,"¹⁶ which was not contemplated at the time the original rules were promulgated. Demand for in-car cell-phone and other communications connectivity is rising and is now a material factor in consumer purchasing decisions. Signal boosters are instrumental in meeting that demand. Nextivity agrees with the Commission's assessment that extending signal booster labeling requirements to embedded signal boosters is impractical and creates an unnecessary burden for manufacturers.¹⁷ Providing the information at the time of vehicle delivery or upon registration with a manufacturer, as the Commission suggests,¹⁸ is a satisfactory alternative to the current labeling requirements.

IV. NEXIVITY URGES THE COMMISSION TO BIFURCATE ENTERPRISE USE ISSUES FROM THE REMAINING SECOND FNPRM ISSUES

Nextivity supports the Commission's process in establishing a sound record to fully consider whether and how enterprise entities should be permitted to employ Wideband Consumer

¹⁶ *Second FNPRM* at ¶ 28.

¹⁷ *See id.* at ¶ 28, n. 66.

¹⁸ *Id.* at ¶ 29.

Signal Boosters without subscribing to the provider's service. Nextivity does, in principle, agree that non-subscriber registrants should, at a minimum, meet the eight criteria set forth by the Commission for operation of a signal booster.¹⁹ However, in light of the importance of the Commission's twin goals of improving Americans' access to wireless service while ensuring that all signal boosters function safely without causing harmful interference to the network,²⁰ the Commission should consider the complex interference issues raised by enterprise use of wideband signal boosters separately from the other issues in this proceeding that can be resolved expeditiously. It is critical to the long term health of the nascent signal booster market that the public (individual and enterprise consumers, as well as carriers) have the highest degree of confidence in the reliability and safety in all forms of signal booster technology. This approach would give the Commission and outside parties adequate opportunity for discussion and technical analysis necessary to reach a reasoned conclusion on the record while enabling other booster proposals and applications to proceed without undue delay.

V. CONCLUSION

The availability of signal boosters to enhance wireless signals is key to ensuring that the nation's wireless networks and scarce spectrum resources are being used as efficiently as possible as the country and affected industries struggle to meet the soaring consumer, business and public safety demand for greater broadband resources. Nextivity therefore supports the Commission's proposal to expand authorization for signal boosters to bands that are now used for mobile wireless networks and urges the Commission to expeditiously rule on issues that have been resolved

¹⁹ *Id.* at ¶ 47.

²⁰ *Id.* at ¶ 34.

without delay while the Commission considers some of the more technically complex issues presented in the Second FNPRM.

Respectfully submitted,

/s/ Catherine Wang

Michiel P. Lotter
CTO & Vice President, Engineering
Nextivity, Inc.
16550 W Bernardo Drive
Building 5, Suite 550
San Diego, CA 92127

Catherine Wang
Denise Wood
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Ave, N.W.
Washington, DC 20004
Tel. (202) 739-3000
Fax (202) 739-3001

Counsel to Nextivity, Inc.

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